A NEW SPECIES OF NYMPHAEOBLASTUS (BLASTOIDEA) FROM THE LOWER CARBONIFEROUS OF QUEENSLAND

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ABSTRACT

Nymphaeoblastus bancroftensis sp. nov. is described from the Lower Carboniferous (Viséan) rocks of the Monto district, south-east Queensland. Relations with previously recognised species from Russia and Japan are briefly discussed.

Specimens of the blastoid were collected by the author in 1960 while mapping Carboniferous sediments to the east of Monto during postgraduate work in the Department of Geology, University of Queensland (U.Q.), and subsequently in 1962, when the locality was revisited during mapping of the Monto 1 : 250,000 Sheet by the Geological Survey of Queensland (G.S.Q.). The species has been found at only one locality 3·5 miles E.S.E. of Bancroft (fig. 1) and even there is very rare. Specimens are preserved as external moulds and internal casts in a dark grey, very fine-grained lithic sandstone, from which the original calcite of calices has been leached by surface weathering processes. The horizon from which the collection was drawn is probably a stratigraphic equivalent of the uppermost part of the Tellebang Formation, defined by Maxwell (1959, 1960), with its typical section on " Baywulla " Station, some 17 miles to the south of the present locality.

Order **FISSICULATA** Jaekel, 1918

Family **PHAENOSCHISMATIDAE** Etheridge and Carpenter, 1886

Genus **NYMPHAEOBLASTUS** von Peetz, 1907, emend. Yakovlev, 1926

Type Species.—*Nymphaeoblastus miljukovi* von Peetz, from the Lower Carboniferous of Kazakhstan, Russia.

Diagnosis.—Calyx elongate-ellipsoidal, section subpentagonal ; basals confined to concave aboral surface ; radials long, deeply incised by radial sinuses ; four deltoids, and on anal side a small epideltoid and large hypodeltoid sharing an oval anal aperture; 10–15 hydrospire slits ; ambulacra linear, extending the full height of the calyx ; side plates small, very numerous ; lancet plate exposed medially.

Previous records of *Nymphaeoblastus* are from the upper Tournaisian and Viséan of Russia (Kazakhstan), and the Viséan of Japan. von Peetz (1907) erected the genus with one species, *N. miljukovi* ; subsequently Yakovlev (1926) re-examined the material, emended the original description, and described a new species, *N. anossofi*. A further species, *N. kasakhstanensis*, was described by Yakovlev

(1941), and more recently, the three species were figured and briefly diagnosed by Yakovlev (1956). Minato (1951) figured specimens of *Nymphaeoblastus* from the Do Zone, Jumonji Stage, Arisu Series of north-east Honshu, Japan. The Jumonji Stage was correlated with the *Syringothyris* Zone of the English Avonian (i.e. Viséan) by Minato (1960). Fay (1961) examined the Japanese specimens and found them to belong to a single species, to which he applied the name *N. anossofi* Yakovlev. *Nymphaeoblastus* has not been recognised previously from the southern hemisphere.

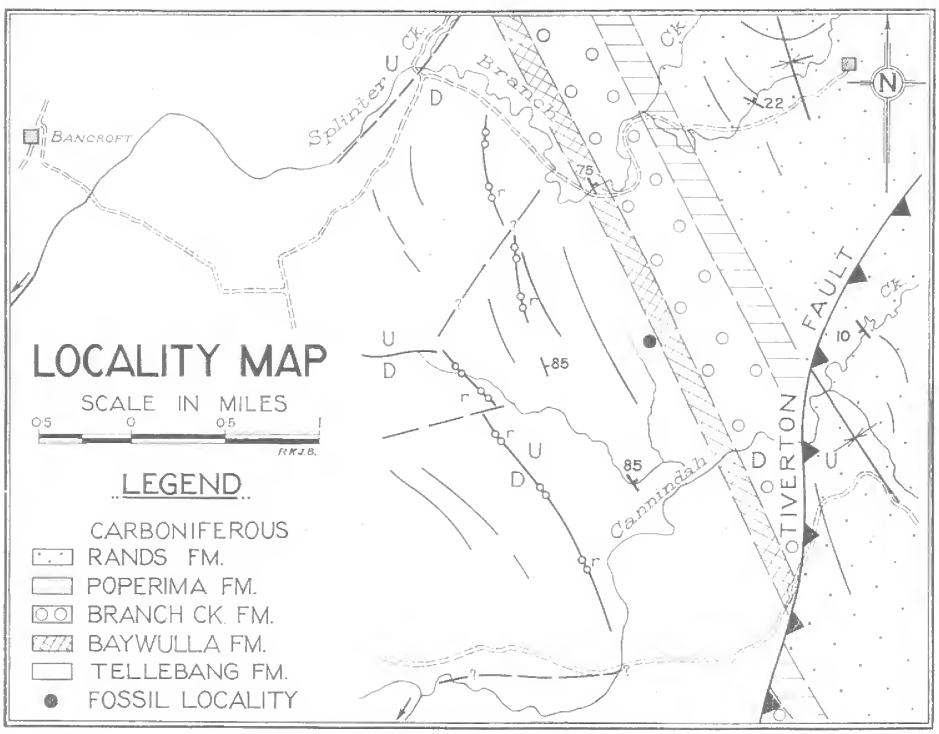

Figure 1.—Blastoid locality near Bancroft, Q.

NYMPHAEOBLASTUS BANCROFTENSIS sp. nov.

(Plate 13, figures 1–4)

MATERIAL.—Holotype, F. 39410, U.Q. Collection; paratype, F. 39411, U.Q. Collection; F. 5781, G.S.Q. Collection; all from the northern part of Portion 72, Parish of Cannindah, County of Yarrol (lat. 24° 48′ 18″ S., long. 151° 17′ 0″ E.): Tellebang Formation (Viséan).

DIAGNOSIS.—Small *Nymphaeoblastus*, subpentagonal in dorsal view; 10–12 short hydrospire slits, largely developed on the radial limbs; ambulacra narrow, 80–85 side plates in each series; deltoids with granular ornament, very fine aborally; radials with lateral, elongate-triangular areas of barred ornament, elsewhere, surface granular.

DESCRIPTION.—The calyx is elongate-ellipsoidal in lateral view and subpentagonal when viewed from above. The summit is flattened or slightly depressed, while the basal area, which is incompletely preserved in each specimen, appears to have been concave.

The five radial plates are unequally pentagonal in outline with a length : width ratio of 4 : 3. Radials recurve adaxially below the long, narrow radial sinus, and the small plate body lies within the basal concavity ; adoral margins flare abaxially a little to contact the deltoids. On the holotype, radials clearly overlap the deltoids, but it is probable that this overlap is due to oblique distortion of the calyx subsequent to burial. Ornament is distinctive. An elongate-triangular area on each radial limb, bordered laterally by the inter-radial suture, and with its apex at the radio-deltoid suture, bears parallel ridges, normal to the inter-radial suture and continuous between adjacent plates. Remaining areas are ornamented by coarse granules and bars roughly aligned along growth lines. Hydrospire slits, which number 10–12 on each side of an ambulacrum, are largely confined to semi-elliptic areas on the adoral portion of each radial limb, with only 0·5 mm. of their length on the adjacent deltoid. Bordering an ambulacrum, the slits are 3 mm. long, but attain a maximum length of 5 mm. before decreasing in size toward the inter-radial suture. No specimen has the anal side of the calyx preserved in the region of the radio-deltoid suture, so that the condition of the hydrospires in this segment is unknown.

The four simple deltoids are subtriangular in outline and a little shorter than the radials. A low median angulation of the deltoids, as seen from above, contributes to the overall subpentagonal outline of the calyx. On the anal side a transverse fracture in the deltoid at the midlength of the oval anal opening on specimen F. 39410 (U.Q.), suggests that two anal deltoids, viz. an aboral hypodeltoid and an adoral epideltoid, were in fact developed. Any definite conclusions on the number and disposition of the anal deltoids is precluded by the type of preservation. Deltoids are ornamented by closely spaced granules and ridges developed in series parallel to the plate margins, and becoming larger and more irregular toward a prominent apical node.

The five linear ambulacra extend from within one millimetre of the oral opening over the full height of the calyx ; the lancet plate is exposed medially over most of this length. 80–85 very small side plates, present on each side of an ambulacrum, alternate across the main food groove between obliquely trending, adorally directed side food grooves. Pairs of large brachiolar facets occur at the adlateral termination of the side food grooves. Presumbly, the aboral facet occupies the surface of a secondary side plate, and the adoral facet the adjacent side plate limb. Minute grooves radiate from the margins of the side plates into the main and side food grooves.

MEASUREMENTS (mm.)

	CALYX		DELTOIDS		RADIALS		AMBULACRA	
	length	width	length	width	length	width	length	width
F. 39410 (U.Q.) Holotype ..	—	—	17·0	9·0	—	—	—	4·1
F. 39411 (U.Q.) Paratype ..	—	—	—	10·3	20·6	15·7	—	4·4
F. 5781 (G.S.Q.)	26·8	20·5	16·5	9·0	17·4	14·8	29·5	3·7

N.B. Individual plate measurements were taken on the curvature.

The four known species of *Nymphaeoblastus* form a morphologically compact group, in which *N. bancroftensis* sp. nov. is particularly closely allied to *N. miljukovi* von Peetz. It differs from the latter only in the less pronounced median angulation

of the deltoids and its finer ornamentation. *N. anossofi* Yakovlev may be distinguished by its rounded outline in dorsal view and uniform coarsely granular ornament. *N. kasakhstanensis* Yakovlev is consistently very large and hydrospire slits are more numerous than in other species.

At the type locality *N. bancroftensis* sp. nov. is associated with a large brachiopod fauna which includes *Rhipidomella fortimuscula* Cvancara, *Schizophoria* cf. *resupinata* (Martin), *Leptagonia* cf. *analoga* (Phillips), *Pulsia* sp., *Antiquatonia* sp., *Eomarginifera* aff. *paradoxa* (Campbell), *Pustula* cf. *abbotti* Campbell, *Chonetes gloucesterensis* Cvancara, *Prospira striatoconvoluta* (Benson and Dun), *Spirifer lirellus* Cvancara, *Spirifer* aff. *duplicosta* Phillips, *Brachythyris pseudovalis* Campbell, *Phricodothyris campbelli* Cvancara, *Spiriferellina baywullensis* Maxwell, *Cleiothyridina* sp., *Composita* sp., *Eumetria* cf. *mona* Campbell, *Dielasma* sp. and *Lingula* sp. The fauna is comparable with that described by Cvancara (1958) from the upper part of the Lower Burindi Group in north-eastern New South Wales, which he correlated with the Osagean faunas of the Burlington and Keokuk Limestones in North America. Recent work on ammonoids and conodonts (Miller and Garner, 1955; Collinson, Scott and Rexroad, 1962) has shown that the Osagean is to be correlated with the lower Viséan of the European sequence. A Viséan age for the Queensland species would be very reasonable, particularly in view of the known range of *Nymphaeoblastus*.

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EXPLANATION OF PLATE XIII

Nymphaeoblastus bancroftensis sp. nov.

Fig. 1. Oral view of holotype, F. 39410 (U.Q.), showing shape and ornament of deltoids, the anus and oral area ; latex cast, X 2.

Fig. 2. Detailed view of "B" ambulacrum of holotype, F. 39410 (U.Q.), showing the food groove system and side plates with brachiolar facets ; external mould, X 11.

Fig. 3. Side view of F. 5781 (G.S.Q.), a partly distorted calyx ; latex cast, X 2 (taken from a weathered external mould.)

Fig. 4. Side view of paratype, F. 39411 (U.Q.), showing shape and ornament of radial plates and the hydrospire slits ; latex cast, X 2.